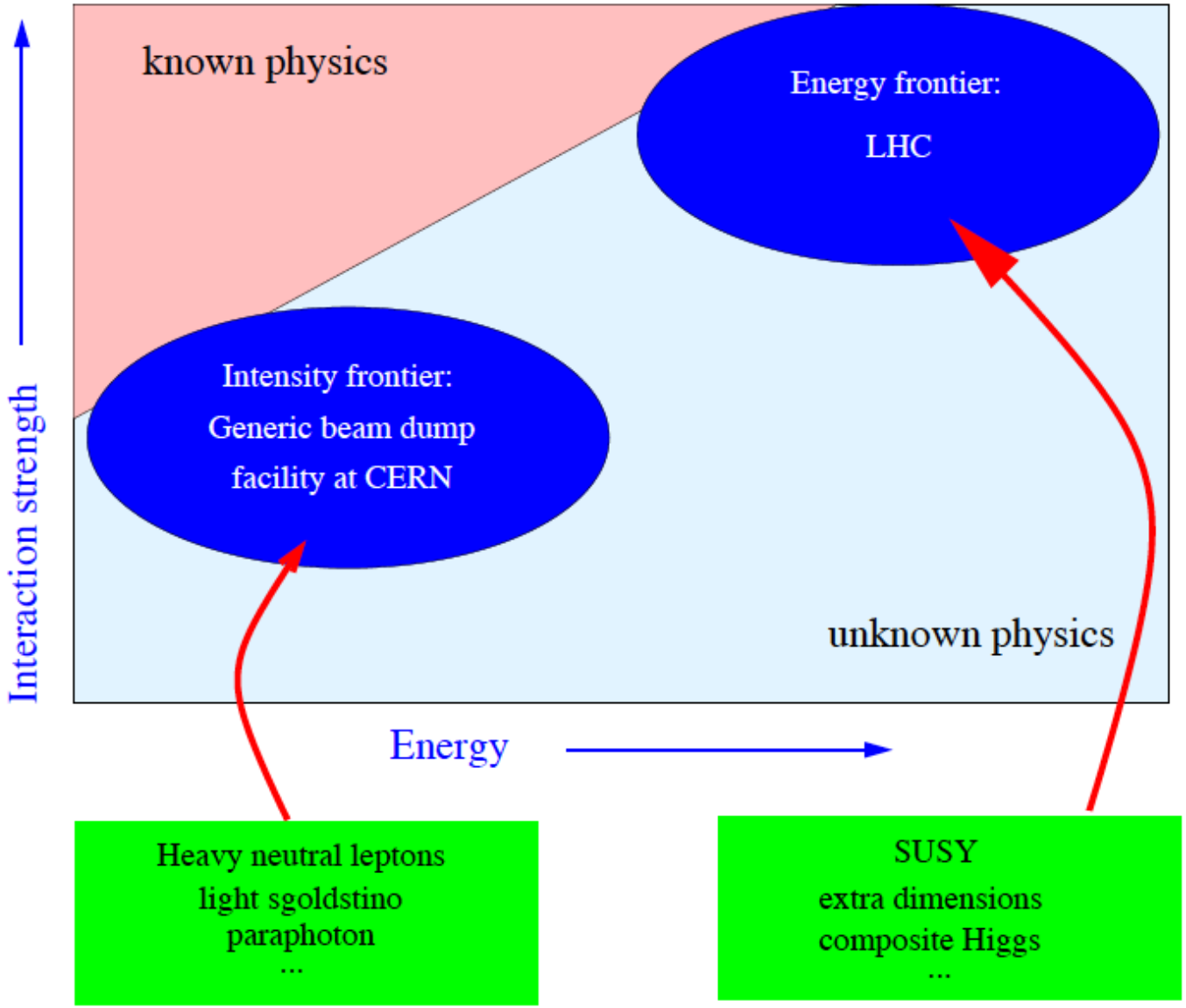



hidden sector:

HNL: baryon asymmetry of the Universe, dark matter, neutrino masses

sgoldstino, light neutralino: SUSY

paraphoton: mirror matter, dark matter

# Primary Beam

Experimental sensitivity based on $2x10^{20}$ protons on target, that is 5 years of equivalent CNGS operation

→ Basic experimental requirements

1. Maximum production of D mesons at an energy of ~400 GeV
   - Energy is driven by optimization between D cross-section, acceptance from boost, and amount of shield to range out muon flux.
2. 6s/7.2s SPS cycles with preference for longest possible extraction spill to reduce detector occupancy
   - Easing requirements on detector and reconstruction
3. Minimal beam induced background in terms of neutrinos and muons
   - Use of a heavy target material (tungsten) to stop pions and kaons
4. HNL production angles relaxes significantly the beam parameters (collimation and alignment)
   - Beam delivery line consisting mainly of drift space and dilution to ease tungsten target design

Based on these requirements, the proponents have investigated a realistic NA option in close contact with beam, target, radiology, and infrastructure experts

- SPS extraction in SPS-LSS2
  - Key study concerns optimal extraction type
- Beam splitting/switch at the top of SPS-NA transfer line (TT20)
  - Key study concerns the possibility of a combined splitter for COMPASS and the EOI-010 experiment transfer line
- A compact target bunker
  - Limited volume by the use of the hadron stopper closing the entrance to the muon shield tunnel
- Wide tungsten target head
  - Key study concerns the solid tungsten target design with heat extraction and mechanical stress
- 60 m tunnel housing optimised combination of passive/active muon shield

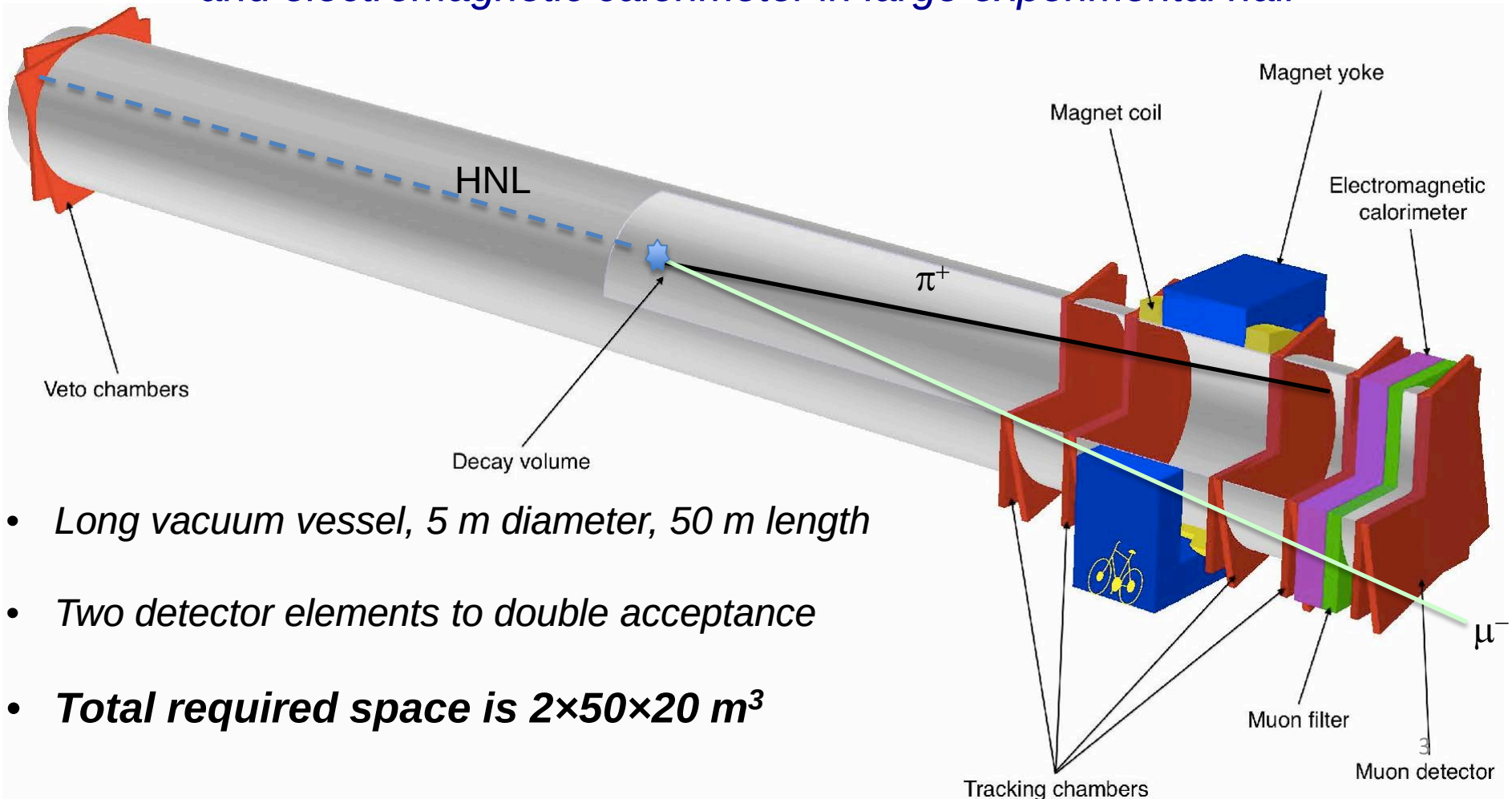
- A significant fraction of studies performed for neutrino facilities are directly beneficial to the current proposal (extraction, TT20 reuse, transfer line, target station, civil engineering and radiological aspects)

# Detector concept

*(based on existing technologies)*

- *Reconstruction of signal decays in the final states: $\mu^-\pi^+$, $\mu^-\rho^+$ & $e^-\pi^+$*

→ *Requires long decay volume, magnetic spectrometer, muon detector and electromagnetic calorimeter in large experimental hall*




- *Long vacuum vessel, 5 m diameter, 50 m length*
- *Two detector elements to double acceptance*
- ***Total required space is 2×50×20 m³***